PHYSICAL EDUCATION

STUDIES – 2A/B

Semester 1 Examination Paper

##### Question/Answer Booklet

Student Name: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Teachers Name: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

### Structure of this paper

|  |  |  |  |
| --- | --- | --- | --- |
| **Section** | **No. of questions available** | **No. of questions to be attempted** | **Marks Available** |
| **A** | **20** | **20** | **/20** |
| **B** | **14** | **14** | **/100** |
| **C** | **1** | **1** | **/15** |
|  |  | **Total** | **/135** |

### Instructions to candidates

1. Write your answers in the spaces provided in this Question/Answer Booklet. A blue or black ballpoint or ink pen should be used. Wherever appropriate, fully labelled diagrams, tables and examples should be used to illustrate and support your answers.
2. Section A is to be answered on the separate multiple answer sheet supplied.

**Section A – Multiple Choice**

A multiple choice answer sheet is provided for you to answer questions in this section. For each question, place a cross (X) over the correct answer.

This section has **TWENTY (20)** questions. Attempt **ALL** questions.

Allow approximately 30 mins for this section [20 marks].

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**1.** Which of the following is not a function of the human skeleton?

A. Produce red blood cells.

B. Act as a store house for calcium.

C. Enable movement

D. Ensures the individual maintains correct posture.

**2.** Which of the following correctly shows the chemical breakdown of ATP to produce energy, when the athlete is using the aerobic energy system?

1. ADP + PC →ATP
2. ATP →ADP + Pi + energy
3. ATP → energy + CO2 + H2O
4. ATP + lactic acid → energy

**3.** The rate of ATP production and the amount of ATP produced by each of the three energy systems is different. Which of the following is true for the ATP-CP system?

1. fast rate, high yield
2. slow rate, low yield
3. fast rate, low yield
4. slow rate, high yield

**4.** Which two of the following physiological characteristics need to increase in order to increase cardiac output?

1. Increased ventilation rate and heart rate
2. Increased haemoglobin concentration in the blood and increased muscle glycogen
3. Increased stroke volume and heart rate
4. Increased phosphocreatine stores and increased blood pressure

**5.** Ventilation rate increases in response to exercise. What is the physiological reason for this?

1. Increased blood pressure
2. Increased heart rate
3. Increased oxygen requirement
4. Increased cardiac output demands

**6.** The function of the pulmonary vein is to:

1. Send deoxygenated blood from the heart to the lungs
2. Send oxygenated blood from the heart to the body
3. Return deoxygenated blood from the body to the heart
4. Return oxygenated blood from the lungs back to the heart

**7.** An 18-year-old woman wants to gain cardiovascular health benefits from physical activity. Which one of the following activities should she undertake?

A. Social tennis every two weeks.

1. A 30-minute walk every day.
2. Twenty push-ups every morning.
3. Weight training when she feels like it.

**8.** Heart-rate is often used to measure and monitor performance. A heart-rate that becomes constant during submaximal exercise indicates

A. that sufficient oxygen is available to meet energy demands.

B. a high level of aerobic capacity.

C. that lactic acid is restricting muscle contraction.

D. that stores of glycogen in the muscles have been depleted.

**9.** Some important chronic effects of a long-term aerobic training program are

A. decreased resting heart-rate and decreased stroke volume during rest.

B. increased stroke volume and increased cardiac output during maximal exercise.

C. increased maximum heart-rate and increased resting heart-rate.

D. increased maximum oxygen uptake and decreased cardiac output during maximal

exercise.

**10.** Refer to the following table:

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Week | Sets | Repetitions | Load (kg) | Rest (s) |
| 1 | 2 | 10 | 60 | 40 |
| 2 | 2 | 10 | 60 | 40 |
| 3 | 2 | 12 | 60 | 40 |
| 4 | 3 | 12 | 60 | 40 |

Which training principle is best illustrated in the table above?

A. Intensity.

B. Frequency.

C. Overload.

D. Specificity.

**11.** What is necessary for the immediate resynthesis of ATP during a long-jump event?

A. Glycogen

B. Lactic acid

C. Oxygen

D. Phosphocreatine

**12.** What type of muscular contraction occurs in the biceps as it shortens when a ‘curl’ is performed using a free weight?

A. Concentric

B. Eccentric

C. Isokinetic

D. Isometric

**13.** What are the likely physiological adaptations to resting heart rate, haemoglobin levels and resting blood pressure in response to aerobic training?

|  |  |  |  |
| --- | --- | --- | --- |
|  | **Resting Heart Rate** | **Haemoglobin levels** | **Resting blood pressure** |
| A. | Increased | Decreased | Increased |
| B. | Increased | Decreased | Decreased |
| C. | Decreased | Increased | Decreased |
| D. | Decreased | Decreased | Increased |

**14.** Refer to the following graph, which shows the stroke volume of two swimmers as the speed of swimming gradually increased:



As their speed increased, the swimmers’ stroke volume was different, but their cardiac output was the same. This was because swimmer Y had a

A. higher heart-rate than swimmer X.

B. lower heart-rate than swimmer X.

C. larger vital capacity than swimmer X.

D. smaller vital capacity than swimmer X.

**15.** Refer to the following table, which shows one section of a training program:

|  |  |  |  |
| --- | --- | --- | --- |
| Repetitions | Distance (m) | Intensity (%) | Recovery time (s) |
| 5× | 70 | 100 | 30 |
| 5× | 60 | 100 | 35 |
| 5× | 50 | 100 | 20 |

The section of a training program shown above is an example of a

A. fartlek program, best suited to a triathlete.

B. long-interval training program, best suited to a 400-metre runner.

C. short-interval training program, best suited to a soccer midfielder.

D. circuit training program, best suited to a basketballer.

**16.** The left atrium receives blood directly from the:

A. aorta

B. pulmonary arteries

C. pulmonary veins

D. superior and inferior vena cava

**17.** Which of the following does not occur during inspiration?

A. Diaphragm rises into the thoracic cavity.

B. The pressure in the lungs falls.

C. The intercostals contract.

D. The rib cage moves upward and outward.

**18.** Which of the following activities requires muscular strength only and would not be regarded as an activity involving muscular power?

A. Shot put.

B. Tug-of-war

C. Cricket fast bowling.

D. Boxing.

**19.** Below is a sample of a short-interval training program.

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Sets | Repitions | Distance (m) | Time (sec) | Rest Interval (sec) |
| 3 | 12 | 20 | 2.2 | 10 |

In the table below, which of the following alternatives does not demonstrate the correct application of the progressive overload principle to the program shown above?

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
|  | Sets | Repitions | Distance (m) | Time (sec) | Rest Interval (sec) |
| A | 3 | 13 | 20 | 2.2 | 10 |
| B | 3 | 12 | 22 | 2.2 | 10 |
| C | 5 | 12 | 20 | 2.2 | 10 |
| D | 3 | 12 | 20 | 2.0 | 10 |

**20.** The fibrous connective tissue which attaches muscle to bone is called:

A. ligament.

B. muscle fibre.

C. tendon.

D. Cartlige

**END OF SECTION A**

**Section B – Short Answer**

This section has **FOURTEEN (14)** questions. Attempt **ALL** questions.

Allow approximately 75 minutes for this section [100 marks].

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**Question 1**

In the table below, name the fitness component required for the groups of activities listed.

|  |  |
| --- | --- |
| **Activities** | **Fitness component** |
| * a spike in volleyball * a leaping intercept in netball or basketball * a drive or long fairway shot in golf |  |
| * 1500 m swim * completing a triathlon * running a marathon |  |
| * tug-of-war * attempting a static hold against an opponent in amateur wrestling * leaning out and attempting to keep a boat upright while sailing |  |
| * sprinting 100 m * AFL full forward leading into space * long jump run up |  |

**4 marks**

**Question 2**



**i.** Name the major fitness component being demonstrated in the photograph above.

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**ii.** List and explain the impact of one of the factors affecting this fitness component.

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**iii.** Which two major muscle groups are responsible for the extension of the squash player’s left hip?

1.\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

2.\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

**5 marks**

**Question 3**

Study the training program shown below.



**a.** Name three recognised training methods used in this program.

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**3 marks**

**b.** Identify and explain two training principles that have been correctly applied in this program.

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**2 marks**

**c.** Identify and explain one training principle that is not directly evident in this program.

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**2 marks**

**d.** What fitness component is this program most likely to develop?

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**1 mark**

**Question 4**

The diagram below shows an athlete performing a bicep curl using a dumbbell.



The athlete uses both the biceps and triceps muscles in performing this movement.

**a.** What term is used to describe the action of the elbow joint when the biceps contract?

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

**1 mark**

**b.** What two terms are used to define the biceps and triceps in this antagonistic action.

Biceps are: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Triceps are: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

**2 marks**

**Question 5**

The following diagram is of a fitness test that people may use as part of a fitness-testing program. The subject is required to complete the course as fast as possible.



**a.** Which fitness component is most likely to be measured by this fitness test?

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

**1 mark**

**b.** Explain why the coach of a tennis player may be more likely to use this fitness test rather than another common test which measures the same fitness component.

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**2 mark**

**c.** Identify another fitness test that can be used to measure this fitness component.

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**1 mark**

**Question 6**

Below is a representation of the ratio of red to white muscle fibres in the quadriceps of three subjects.



**a.** Which diagram, A, B or C, best represents the fibre ratio of an elite 100 m sprinter?\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

**1 mark**

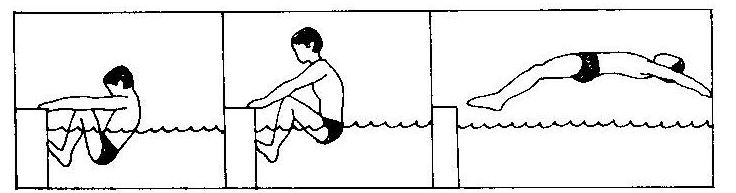
**b.** State two characteristics of slow twitch muscle fibres.

i. \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

ii.\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

**2 marks**

**Question 7**



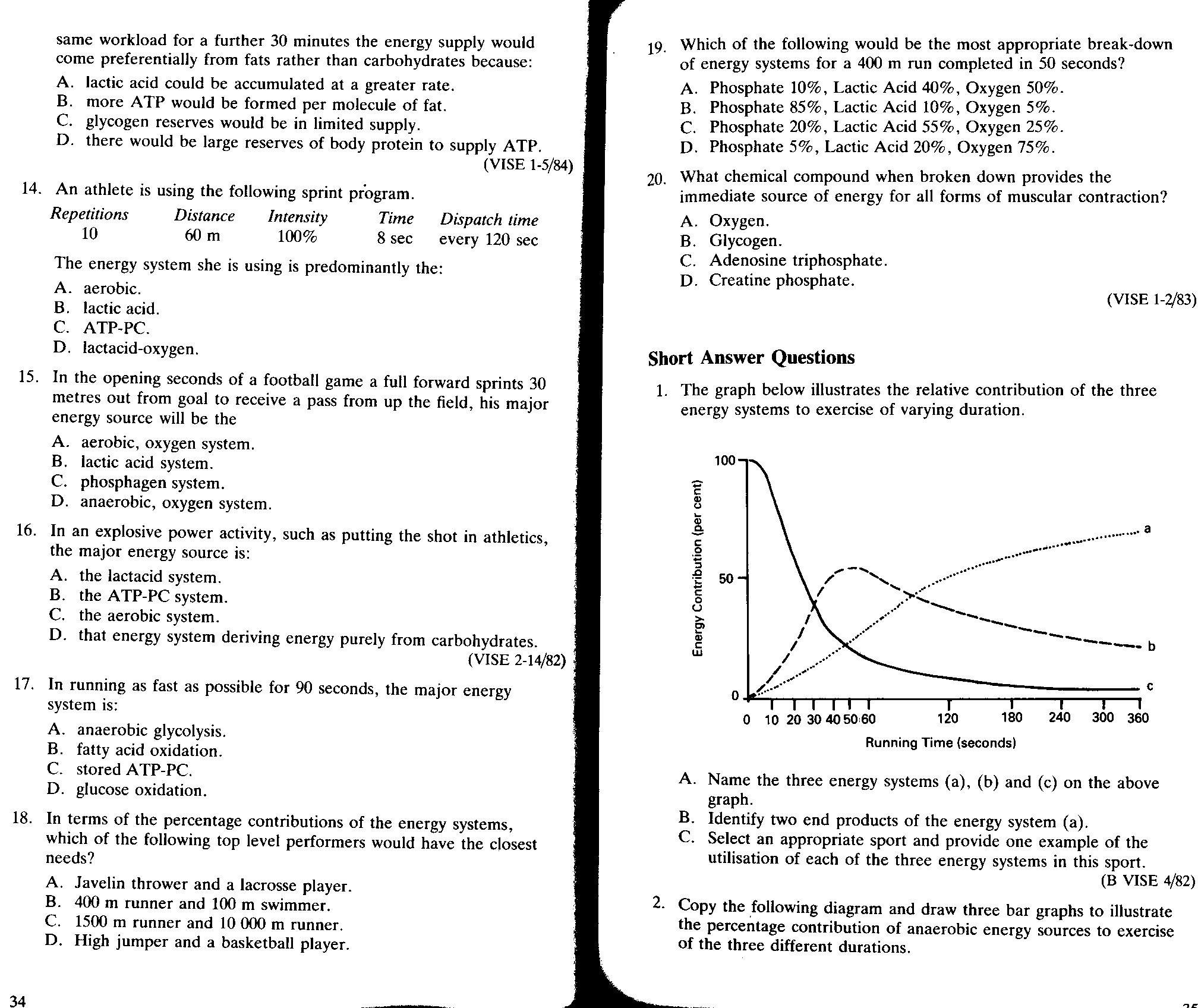
In the diagram sequence of the backstroke start, what is the movement performed at each of the following joints?

* 1. Ankle \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
  2. Knee \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
  3. Trunk \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
  4. Shoulder \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

**4 marks**

**Question 8**

The graph below illustrates the relative contribution of the three energy systems to exercise of varying duration.



**a.** Name the three energy systems:

(a)\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

(b)\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

(c)\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

**3 marks**

**b.** Identify two by-products of energy system (a).

1. \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
2. \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

**2 marks**

**c.** Select an appropriate sport and provide one example of the utilisation of each of the three energy systems in this sport.

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**6 marks**

**Question 9**

Lisa, a 25 year old, runs 6 km, twice a week. She maintains a heart rate of 130 beats per minute and talks with her running partner all the way. Monthly, she does a time trial but finds her time is always close to 30 minutes.

**a.** Identify what type of training Lisa is doing and name two benefits of this type of training?

**3 marks**

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**b.** Discuss why Lisa’s times do not improve with respect to

(i) intensity

(ii) progressive overload

(iii) frequency

**6 marks**

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**c.** Training programs produce chronic (long-term) training effects. In the table below state one cardiovascular adaptation and one muscular adaptation, which will occur as a result of each type of training listed.

**4 marks**

|  |  |  |
| --- | --- | --- |
| **Training focused on improving** | **Cardiovascular adaptation** | **Muscular adaptation** |
| Anaerobic capacity |  |  |
| Aerobic capacity |  |  |

**d.** State the muscle fibre type likely to benefit most from training focused on improving lactic acid tolerance.

**1 mark**

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**Question 10**

Peter Robertson is an elite triathlete and was world champion over the Olympic distance (1.5km swim, 40 km bike and 10km run) in 2001, 2003 and 2005. His average event time is approximately 2 hours.

**a.** Identify a pre, during and post event nutritional strategy that Peter should use and discuss their benefits.

**3 marks**

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**b.** Peter’s endurance training will alter the way his skeletal muscle uses carbohydrates and fats throughout the event compared to a less trained person. State one of the changes in fuel use during the event occurring as a result of endurance training.

**1 mark**

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**c.** Explain how this change improves performance as the event is nearing the end.

**2 marks**

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**d.** The following table shows two meals, one is designed as a pre-race meal and the other as a post-race meal.

|  |  |  |
| --- | --- | --- |
| **Meal A** | **Meal B** | |
| Low-fat strawberry milkshake/smoothie | Sports or soft drink | |
| Apple | Honey sandwich | |
| Wholemeal bread roll | Dried fruit | |
| Water | Sweets (lollies) | |
| Baked Beans | | Watermelon |

Identify which of these meals is better eaten 1–2 hours prior to the start of an endurance event. Explain your answer.

**2 mark**

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**e.**  Stretching and flexibility can be improved by training. Briefly explain the **three** different types of flexibility training.

**3 marks**

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**Question 11**

Athletes of team sports have to fill a variety of positions and are often classified as strikers, mid- fielders or goal-keepers. All of these positions vary slightly in the training that is required, the energy systems utilised and the skills they need to develop.

**a.** Contrast the characteristics of the energy system used predominantly by goalkeepers to the system used by field players.

**4 marks**

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**b.** Describe which method of training is more beneficial for goal keepers - interval or fartlek.

**3 marks**

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**c.** Choose two principles of training and describe their impact upon a goalkeeper’s training.

**2 marks**

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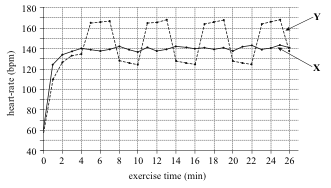
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**Question 12**

Refer to the following graph, which shows the heart-rate (bpm) of a 20-year-old runner during two separate running training sessions (**X** and **Y**):

**

**a.** State the name of the training method used in:

**1 mark**

(i) Session **X**. \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

(ii) Session **Y**. \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

**b.** Choose a sporting activity and explain how a coach would use the training method for session **Y** in his or her program.

**3 marks**

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**Question 13**

**a.** Briefly discuss how a high jumper’s recovery in between jumps would be different from a 200m track sprinter’s recovery in between the semi-final and final.

**2 marks**

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**b.**  The 200m sprinter completes 8 repetitions of 150m in 18 seconds (high intensity), with a 3 minute recovery between repetitions.

**4 marks (1 + 1 +2)**

**i.** What is the name given to this type of training?

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**ii.** What is the predominant energy system being trained while undertaking this session.

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**iii.**  Calculate the work to rest ratio being applied.

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**c.** Complete the following table by inserting the words “increased”, “decreased” or “unchanged” to indicate the likely adaptations experienced by the sprinter following nine months of training.

**8 marks**

|  |  |
| --- | --- |
| **Oxidative enzymes** |  |
| **Glycolytic capacity** |  |
| **Mitochondria density** |  |
| **Capillary density** |  |
| **Phosphocreatine stores** |  |
| **Triglyceride stores** |  |
| **Muscle size** |  |
| **Contraction speed** |  |

**Question 14**

The following table contains a weights program that a student is undertaking to improve muscular power in his arms and legs.

|  |  |  |  |
| --- | --- | --- | --- |
| **Exercise** | **Sets** | **Reps** | **Weight** |
| Lat pull-down | 3 | 5 | 70 kg |
| Seated leg press | 3 | 5 | 98 kg |
| Shoulder press | 6 | 15 | 42 kg |
| Bicep curl | 4 | 10 | 27 kg |
| Leg extension | 4 | 5 | 53 kg |
| Bench press | 6 | 15 | 40 kg |
| Tricep extension | 4 | 5 | 53 kg |
| Leg curl | 3 | 5 | 40 kg |

**a.** To achieve improvements in muscular power, at what % of 1RM should the student be setting their weights for the above program?

**1 marks**

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**b.** Identify three (3) activities in the above program that are inappropriate to the stated goal of muscular power improvement. Justify your answer.

**3 marks**

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**c.** Using the seated leg press as an example, indicate how the student would correctly apply the principle of overload to the program.

**2 marks**

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**END OF SECTION B**

**Section C – Extended Answer**

This section has **ONE (1)** question.

Allow approximately 45 minutes for this section [15 marks].

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**Question 1**

Professional road cycling races, such as the Tour de France, last 21 days during which the cyclists must cover over 3500 kilometres. In some phases of the race, exercise intensity is high, as the cyclists must complete prolonged periods of exercise (e.g. time trials, high mountain ascents) at a high percentage of maximal oxygen uptake.

Australia’s Cadel Evans has performed extremely well in the Tour de France over the past couple of years. He cycles 30 000 to 35 000 km per year in training and competition.

**a.** Identify the two major fitness components required by professional cyclists in the Tour de France and outline why they are important.

**4 marks**

**b.** Carbohydrates are required at each part of the race; the lead up to the race, cycling each day and during recovery. Outline the different roles that carbohydrates play at each part of the race.

**3 marks**

**c.** Identify the chronic effects of aerobic training on Cadel’s body and describe how these adaptations would assist his performance.

**8 marks**

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**END OF PAPER**